

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) An alloy which comprises:

Si : 6.5 - 7.5 wt%

Fe : up to 0.20 wt%

Cu : up to 0.05 wt%

Mn : up to 0.05 wt%

Mg : 0.40 to 0.45 wt%

Zn : up to 0.05 wt%

Ti : up to 0.20 wt%

and the balance Al and other components, wherein said other components comprise a total of not more than 0.15 wt% of said alloy and any single component of said other components does not exceed 0.05 wt% of said alloy, the alloy having a microstructure which includes a primary aluminum-containing matrix and one or more iron-containing phases dispersed in the matrix, wherein the sole or predominant iron-containing phase is β phase that has formed as a transformation product of π phase and wherein the matrix has a dendrite arm spacing of between 10 and 40 μm .

2. (Previously Presented) The alloy defined in claim 1, wherein when the alloy includes more than one iron-containing phase, the iron-containing phases also include π phase.

3. (Previously Presented) The alloy defined in claim 2, wherein the π phase is up to 30 vol % of the iron-containing phases.

4. (Canceled)

5. (Previously Presented) A method for manufacturing an alloy article comprising the steps of:

(a) providing a melt having a composition of:

Si : 6.5 - 7.5 wt%

Fe : up to 0.20 wt%

Cu : up to 0.05 wt%

Mn: up to 0.05 wt%

Mg : 0.40 to 0.45 wt%

Zn: up to 0.05 wt%

Ti : up to 0.20 wt%

and the balance Al and other components, said other components comprising a total of not more than 0.15 wt% of said alloy and any single component of said other components not exceeding 0.05 wt% of said alloy,

(b) casting said melt and solidifying a casting at a cooling rate that produces a microstructure of an aluminum-containing matrix and π and β iron-containing phases dispersed in the matrix, wherein the cooling rate on solidification is sufficient to produce a dendrite arm spacing in the matrix of between 10 and 40 μm ;

(c) solution heat treating the casting to at least partially transform π phase to β phase; and

(d) quenching the casting to form the alloy article.

6. (Canceled)

7. (Previously Presented) The method defined in claim 5, wherein the sole or predominant iron-containing phase in the alloy article is β phase.

8. (Previously Presented) The method defined in claim 5, wherein when the alloy includes more than one iron-containing phase in the alloy article, the iron-containing phases also include π phase.

9. (Previously Presented) The method defined in claim 8, wherein the π phase is up to 30 vol % of the iron-containing phases.

10. (Previously Presented) The method defined in claim 5, wherein the step of solidifying the casting produces iron-containing phases that include a substantial proportion of π phase and the subsequent solution heat treatment step is effective to convert a majority of the π phase to β phase to give a microstructure in the alloy article that includes iron-containing phases which are predominantly β phase.

11. (Previously Presented) The method defined in claim 5, wherein prior to casting the melt is at a temperature above the liquidus temperature of the alloy.

12. (Previously Presented) The method defined in claim 5, wherein the quenching step is in hot water having a temperature of 70-80°C.

13. (Previously Presented) The method defined in claim 5, the steps further including an aging heat treatment of the alloy article.

14. (Previously Presented) The method defined in claim 13, wherein the aging heat treatment includes heating the alloy article to a temperature of 140-170°C, holding the alloy article at that temperature for 1-10 hours, and air cooling the alloy article to room temperature.

15-17. (Canceled)

18. (Previously Presented) The method defined in claim 10, wherein, prior to casting, the melt is at a temperature above the liquidus temperature of the alloy.

19. (Previously Presented) The method defined in claim 18, wherein the quenching step is in hot water having a temperature of 70-80°C.

20. (Previously Presented) An alloy comprising:

Si : 6.5 - 7.5 wt%

Fe : up to 0.20 wt%

Cu : up to 0.05 wt%

Mn : up to 0.05 wt%

Mg : 0.40 to 0.45 wt%

Zn : up to 0.05 wt%

Ti : up to 0.20 wt%

and the balance Al and other components, wherein said other components comprise a total of not more than 0.15 wt% of said alloy and any single component of said other components does not exceed 0.05 wt% of said alloy;

wherein said alloy has a microstructure which includes a primary aluminum-containing matrix and one or more iron-containing phases dispersed in the matrix, wherein the sole or predominant iron-containing phase is β phase that has formed as a transformation product of π phase, the matrix having a dendrite arm spacing of between 10 and 40 μm ;

wherein said alloy satisfies the following relationship:

$$\text{Q.I.} = \text{UTS} + 150 \log_{10} E$$

where Q.I. is Quality Index (Mpa), UTS is Ultimate Tensile Strength (Mpa), and E is Elongation at Fracture (%); and

wherein for said Mg content of 0.40 to 0.45 wt%, said Q.I. does not vary substantially with small changes in said Mg content.

21. (Previously Presented) A method for manufacturing an alloy article comprising the steps of:

(a) providing a melt having a composition of:

Si : 6.5 - 7.5 wt%

Fe : up to 0.20 wt%

Cu : up to 0.05 wt%

Mn: up to 0.05 wt%

Mg : 0.40 to 0.45 wt%

Zn: up to 0.05 wt%

Ti : up to 0.20 wt%

and the balance Al and other components, said other components comprising a total of not more than 0.15 wt% of said alloy and any single component of said other components not exceeding 0.05 wt% of said alloy;

(b) casting said melt and solidifying a casting at a cooling rate that produces a microstructure of an aluminum-containing matrix and π and β iron-containing phases dispersed in the matrix, wherein the cooling rate on solidification is sufficient to produce a dendrite arm spacing in the matrix of between 10 and 40 μm ;

(c) solution heat treating the casting for 2 to 3.9 hours to produce desired levels of transformation of π phase to β phase; and

(d) quenching the casting to form the alloy article.

22. (Currently Amended) The alloy defined in claim 20, wherein the matrix has an average dendrite arm spacing of between 10 and 20 μm .

23. (Currently Amended) The method defined in claim 21, wherein the cooling rate on solidification is sufficient to produce an average dendrite arm spacing in the matrix of between 10 and 20 μm .

24. (New) A method for manufacturing an alloy article comprising:

(a) providing a melt having a composition of:

Si : 6.5 - 7.5 wt%

Fe : up to 0.20 wt%

Cu : up to 0.05 wt%

Mn: up to 0.05 wt%

Mg : 0.40 to 0.45 wt%

Zn: up to 0.05 wt%

Ti : up to 0.20 wt%

and the balance Al and other components, said other components comprising a total of not more than 0.15 wt% of said alloy and any single component of said other components not exceeding 0.05 wt% of said alloy;

(b) casting said melt and solidifying a casting at a cooling rate that produces a microstructure of an aluminum-containing matrix and π and β iron-containing phases dispersed in the matrix, wherein the cooling rate on solidification is sufficient to produce an average dendrite arm spacing in the matrix of between 10 and 40 μm ;

(c) solution heat treating the casting to at least partially transform π phase to β phase; and

(d) quenching the casting to form the alloy article;

wherein the solidifying the casting produces iron-containing phases that include a substantial proportion of π phase and the subsequent solution heat treatment is effective to convert a majority of the π phase to β phase to give a microstructure in the alloy article that includes iron-containing phases which are predominantly β phase.

25. (New) The method defined in claim 24, wherein the solution heat treating includes solution heat treating the casting for 2.0 to 3.0 hours to produce desired levels of transformation of π phase to β phase.